WE CLAIM:

1. An isolated primer for amplifying a segment of DNA comprising:

a linear oligonucleotide comprising a 5' end and a 3' end, said oligonucleotide consisting of at least 35 nucleotides, wherein a first portion of said oligonucleotide of at least 13 nucleotides at the 5' end of said oligonucleotide and a second portion of the oligonucleotide of from 5 to 22 nucleotides at the 3' end of the oligonucleotide are precisely complementary to a first portion and a second portion, respectively, of a segment of a cDNA or genomic DNA, wherein 4-8 nucleotides between the first portion and the second portion of the oligonucleotide comprise a recognition site for a restriction endonuclease that cleaves at least 5 nucleotides from its recognition site, wherein the segment of the cDNA or genomic DNA does not comprise the recognition site.

2. The primer of claim 1 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises from 0 to 12 nucleotides between the first portion of said segment and the second portion of said segment.

3. The primer of claim 1 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises from 4 to 8 nucleotides between the first portion of said segment and the second portion of said segment.

4. The primer of claim 1 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises 6 nucleotides between the first portion of said segment and the second portion of said segment.

5. The primer of claim 1 wherein the restriction endonuclease is a Type IIS restriction endonuclease.

6. The primer of claim 5 wherein the Type IIS restriction endonuclease is BpmI.

7. The primer of claim 1 wherein the restriction endonuclease cleaves DNA at least 8 nucleotides from its recognition site.

8. An isolated primer for amplifying a segment of DNA comprising:

a linear oligonucleotide comprising a 5' end and a 3' end, said oligonucleotide consisting of at least 35 nucleotides, wherein a first portion of said oligonucleotide of at least 13 nucleotides at the 5' end of said oligonucleotide and a second portion of the oligonucleotide of from 5 to 22 nucleotides at the 3' end of the oligonucleotide are substantially complementary to a first portion and a second portion, respectively, of a segment of a cDNA or genomic DNA, wherein 4-8 nucleotides between the first portion and the second portion of the oligonucleotide comprise a recognition site for a restriction endonuclease that cleaves at least 5 nucleotides from its recognition site, wherein the segment of the cDNA or genomic DNA does not comprise the recognition site.

9. The primer of claim 8 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises from 0 to 12 nucleotides between the first portion of said segment and the second portion of said segment.

10. The primer of claim 8 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises from 4 to 8 nucleotides between the first portion of said segment and the second portion of said segment.

11. The primer of claim 8 wherein the segment of the cDNA or genomic DNA to which the first and second portions of the oligonucleotide are complementary comprises 6 nucleotides between the first portion of said

segment and the second portion of said segment.

12. The primer of claim 8 wherein the restriction endonuclease is a Type IIS restriction endonuclease.

13. The primer of claim 12 wherein the Type IIS restriction endonuclease is BpmI.

14. The primer of claim 8 wherein the restriction endonuclease cleaves DNA at least 8 nucleotides from its recognition site.

15. An isolated pair of primers for amplifying a segment of cDNA or genomic DNA,

wherein each primer comprises a linear oligonucleotide comprising a 5' end and a 3' end, said oligonucleotide consisting of at least 35 nucleotides, wherein a first portion of said oligonucleotide of at least 13 nucleotides at the 5' end of said oligonucleotide and a second portion of the oligonucleotide of from 5 to 22 nucleotides at the 3' end of the oligonucleotide are precisely complementary to a first portion and a second portion of a cDNA or genomic DNA, wherein 4-8 nucleotides between the first portion and the second portion of the oligonucleotide comprise a recognition site for a restriction endonuclease that cleaves at least 5 nucleotides from its recognition site, wherein the segment of the cDNA or genomic DNA does not comprise the recognition site for the restriction endonuclease,

wherein each primer of the pair of primers is complementary to an opposite strand of a double stranded cDNA or genomic DNA molecule, wherein the pair of primers is complementary to two non-contiguous portions of the double stranded cDNA or genomic DNA molecule, wherein 1 to 20 nucleotides separate the two non-contiguous portions of the double stranded cDNA or genomic DNA molecule.

16. The pair of primers of claim 15 wherein the restriction endonuclease is a Type IIS restriction endonuclease.

17. The pair of primers of claim 15 wherein a single nucleotide polymorphism maps to the 1 to 20 nucleotides which separate the two non-contiguous portions of the double stranded DNA molecule.

18. The pair of primers of claim 15 which are contained in a kit.

19. The pair of primers of claim 18 wherein the kit further comprises the restriction endonuclease.

20. A kit comprising a plurality of pairs of primers according to claim 15.

21. An isolated pair of primers for amplifying a segment of cDNA or genomic DNA,

wherein each primer comprises a linear oligonucleotide comprising a 5' end and a 3' end, said oligonucleotide consisting of at least 35 nucleotides, wherein a first portion of said oligonucleotide of at least 13 nucleotides at the 5' end of said oligonucleotide and a second portion of the oligonucleotide of from 5 to 22 nucleotides at the 3' end of the oligonucleotide are substantially complementary to a first portion and a second portion of a cDNA or genomic DNA, wherein 4-8 nucleotides between the first portion and the second portion of the oligonucleotide comprise a recognition site for a restriction endonuclease that cleaves at least 5 nucleotides from its recognition site, wherein the segment of the cDNA or genomic DNA does not comprise the recognition site for the restriction endonuclease,

wherein each primer of the pair of primers is complementary to an opposite strand of a double stranded cDNA or genomic DNA molecule, wherein the pair of primers is complementary to two non-contiguous

portions of the double stranded cDNA or genomic DNA molecule, wherein 1 to 20 nucleotides separate the two non-contiguous portions of the double stranded cDNA or genomic DNA molecule.

22. The pair of primers of claim 21 wherein the restriction endonuclease is a Type IIS restriction endonuclease.

23. The pair of primers of claim 21 wherein a single nucleotide polymorphism maps to the 1 to 20 nucleotides which separate the two non-contiguous portions of the double stranded DNA molecule.

24. The pair of primers of claim 21 which are contained in a kit.

25. The pair of primers of claim 21 wherein the kit further comprises the restriction endonuclease.

26. A kit comprising a plurality of pairs of primers according to claim 21.

27. A method for producing a short segment of DNA, suitable for analysis by mass spectrometry, comprising the steps of:

amplifying cDNA or genomic DNA of a subject using the pair of primers of claim 15 to form amplified DNA;

digesting the amplified DNA with the restriction endonuclease to form a short segment of DNA.

28. A method for producing a short segment of DNA, suitable for analysis by mass spectrometry, comprising the steps of:

amplifying cDNA or genomic DNA of a subject using the pair of primers of claim 21 to form amplified DNA;

digesting the amplified DNA with the restriction endonuclease to form a short segment of DNA.

29. A method for analyzing a first short segment of DNA comprising a first polymorphic nucleotide to distinguish the first short segment of DNA from a second short segment of DNA comprising a second polymorphic nucleotide, the method comprising the steps of:

applying a mixture of DNA segments to an electrospray ionization/ mass spectrometer, whereby the DNA segments are denatured and the denatured segments are separated, wherein the mixture of DNA segments is made by the process of:

amplifying cDNA or genomic DNA of a subject using the pair of primers of claim 15 to form amplified DNA; and
digesting the amplified DNA with the restriction endonuclease to form a short segment of DNA.

30. A method for analyzing a first short segment of DNA comprising a first polymorphic nucleotide to distinguish the first short segment of DNA from a second short segment of DNA comprising a second polymorphic nucleotide, the method comprising the steps of:

applying a mixture of DNA segments to an electrospray ionization/ mass spectrometer, whereby the DNA segments are denatured and the denatured segments are separated, wherein the mixture of DNA segments is made by the process of:

amplifying cDNA or genomic DNA of a subject using the pair of primers of claim 21 to form amplified DNA; anddigesting the amplified DNA with the restriction endonuclease to form a short segment of DNA.